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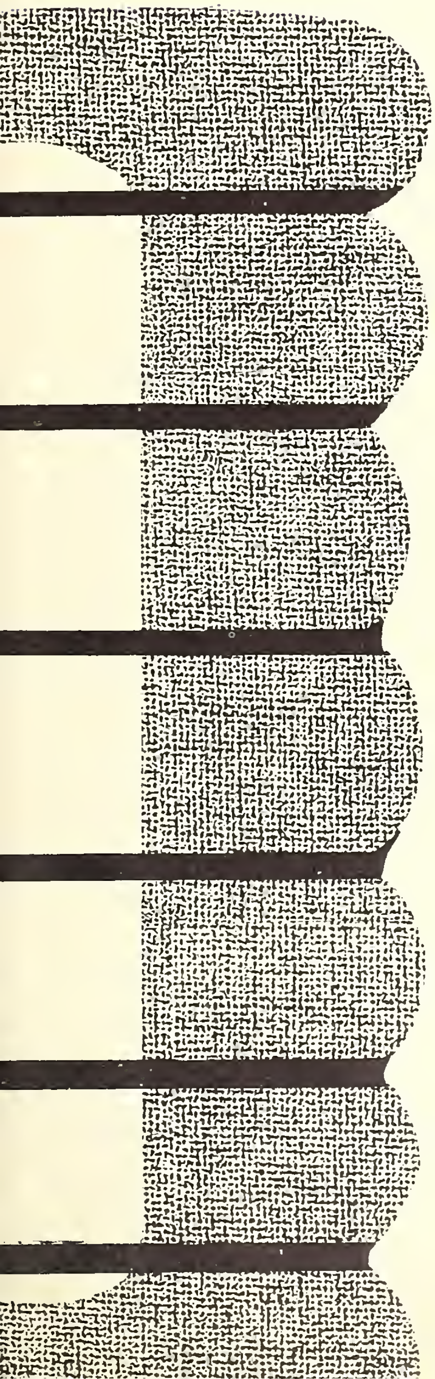
Marketing Research Report No. 303

Cotton Bale Coverings



Agricultural Marketing Service
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SUMMARY

Objectives of this study were: (1) To provide information on the type, weight, and condition of materials used in baling upland cotton; and (2) to describe some recent developments in the packaging of cotton. Complaints have been frequent concerning materials used in covering American cotton bales and the condition of the coverings on arrival at mills.

Information was obtained from 933 of the approximately 6,300 saw gins in operation during the 1957-58 season. These gins were selected as being typical in terms of size and type of equipment.

In 1957-58, about 54 percent of the crop was covered with open-weave jute bagging and 46 percent with sugar-bag cloth, a closely woven fabric. This indicated that the long-term, slow, but generally steady increase in the use of sugar-bag cloth was continuing. Sugar-bag cloth was used extensively in the Southeast and Southwest, while open-weave jute was the leading cover in the South Central and Western regions. For the Cotton Belt as a whole, only 1 percent of the total crop was wrapped in second-hand open-weave jute, use of such material being most common in the Southeast. This figure was much below the approximately 8 percent used in 1933-34.

Custom was a substantial factor in selection of bagging by type. Aside from this, ginners selected open-weave jute largely because of ease of handling the bales so covered, and of the rapid drying out of such bales when dampened by showers. Specific reasons for selecting sugar-bag cloth included added protection of bales during sand and dust storms and reasons of economy, this bagging usually being cheaper than new open-weave jute.

During 1957-58, approximately 95 percent of bales were bound with new ties. In the Southeast, however, second-hand ties were used for about one-third of the crop.

The average weight of bagging per bale was 11.8 pounds, ranging from 11.5 pounds in the Southeast to 12.1 pounds in the South Central region. For the Belt as a whole, bales carried an average of 9.3 pounds of ties. The average bale tare (combined weight of bagging and ties) therefore, was 21.1 pounds. Differences among States ranged from 20.2 pounds in North Carolina up to 22.2 pounds in Mississippi. In the South Central region, bale tare averaged 21.8 pounds, about 1 full pound greater than in other regions.

On the average, strips of sugar-bag cloth were 49 inches wide and 108 inches long. Average measurements for open-weave jute were 45 by 107 inches. Two such strips are used in covering a bale.

About 98 percent of gins were equipped with presses forming a conventional or so-called flat bale, using 6 ties per bale. The other 2 percent of gins packaged cotton into extra-density bales requiring 8 or 9 ties per bale. This 2 percent of gins, however, accounted for 5 percent of the upland crop.

New ties for flat bales normally weigh 9 pounds per bale, although more expensive ties are available that weigh 12 pounds. About 7 percent of bales were bound with 6 new ties of 12-pound total weight, but about one-fifth of ginnings in the South Central region had these heavy ties. Indications were that use of heavy ties had increased in recent years because of difficulties encountered in baling cotton dried at high temperatures to facilitate removal of leaf and other foreign matter during ginning.

Until very recently, arrow buckles were used almost exclusively in securing ties on flat bales. Improved flat bale buckles were introduced in 1955 and were being used for about two-thirds of the crop by 1957-58.

As a further aid in baling cotton with low moisture content, some ginners have installed devices for adding moisture in spray form to lint just before baling. Although 14 percent of gins were so equipped, only 10 percent of gins used such devices in 1957-58. Gins having and using lint-conditioning devices ginned about 2 million bales and conditioned approximately 1.2 million of these by adding an average of 4.7 pounds of moisture per bale.

Suggestions offered by ginners for bale improvement centered around the fact that bales generally are neat and functional when they leave the gin, and marketing practices usually account for the later ragged appearance. This emphasizes that the problem demands the full cooperative effort of all branches of the cotton industry.

COTTON BALE COVERINGS

by R. C. Soxman, agricultural economist, and
Andrew C. Robison, cotton marketing specialist 1/

THE ROLE OF BALE COVERING IN COTTON BALE IMPROVEMENT

The cotton bale cover provides protection and "window display" for about 2 billion dollars' worth of American cotton annually. Frequent complaints have been made concerning the bale covers because of such deficiencies as unsightly appearance, poor protective qualities, and unnecessary weight. Bales normally have a neat appearance when initially prepared at gins, but often reach consuming mills in very ragged condition. Numerous serious attempts have been made to improve the traditional rectangular or so-called "square" bale, but trading rules and market sampling customs have blocked any significant modification.

Cotton bales usually are partly covered with 2 strips of bagging and bound with 6 flat steel ties or bands. The weight of bagging is approximately 12 pounds and of ties about 9 pounds, a combined weight of about 21 pounds. This so-called gin or flat bale is basically a simple type of package which appears to lend itself readily to modification.

American upland cotton is priced and the bales are bought and sold according to total gross bale weight. Under this gross weight system of trading, rules generally specify that bale tare (combined weight of bagging and ties) must not exceed 4.4 percent of total bale weight, or about 22 pounds for a 500-pound flat bale. This, for practical purposes, forces the use of heavy bagging and ties, because any grower routinely marketing a bale with an appreciably lighter tare than specified actually would be including some cotton for which no payment was received. Materials in use quite naturally have gravitated towards those that provide the maximum allowable weight at lowest cost. Efforts to convert trading to a net-weight system have consistently met defeat.

Sampling during marketing also is a significant factor. A sample of cotton customarily is drawn from the bale by cutting a sizable hole in the bagging on both sides. Generally, bales are sampled 3 or more times during marketing, creating 6 or more holes in the cover. Also, handling frequently results in further deterioration of the bagging, sheared ties, and broken buckles. It would be difficult, under the present system, for bagging of any material to remain neat and protective.

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Cost also is a prime factor, and some promising changes in baling materials have failed because of added price. Expenditures by cotton growers for bagging materials averaged $4.13 per bale during the 1957-58 season, a total outlay estimated at 44 million dollars for the upland crop.

In spite of the history of frustration in baling improvement work, an experimental program is under way on a broad front. This latest effort has been spearheaded by the National Cotton Council and the U. S. Department of Agriculture, and aided by the National Cotton Warehouse and Cotton Compress Association, numerous cotton growers, ginners, shippers, and spinners, and some industrial firms. Considerable progress has been made in field-testing a variety of substitute covering materials and in accumulating background information. Although the problem is clear in broad outline, information has been lacking on specific economic losses occurring from package deficiencies, and on the exact weight, condition, and type of baling materials being used in various parts of the Cotton Belt.

Beginning with the 1956 crop, the Commodity Credit Corporation has required that all bales accepted in the cotton loan program must have the heads fully covered with bagging. This provision has encouraged use of an adequate length of bagging and greater care in arranging the bagging when bales are being tied out at gins. Also, the increased use of automatic sampling devices and extra-density bale presses at gins in the West and Southwest is being watched with interest across the Belt, to observe the effects on packaging and marketing efficiency. Recently, improved types of bale tie buckles have been made available to ginners. Altogether, these happenings have resulted in some slight improvement in the cotton package and may lead to real progress.

PURPOSE AND PLAN OF STUDY

Objectives of this study were: (1) To develop specific information on the type, condition, and weight of materials used in covering bales of upland cotton; and (2) to indicate some of the more recent developments in the packaging of cotton.

Information was obtained by personal interview from 933 of the approximately 6,300 saw gins in operation during the 1957-58 season, the selected gins being considered typical in terms of size and type of equipment. The same group of personnel who selected the gins for use in this study previously had conducted an equipment survey of all gins that operated in 1956-57. Data were collected on the type, condition, dimensions, and weight of bagging and ties used in covering cotton bales, together with information on certain supplemental aspects of packaging.

Although weight and dimensions of bagging were obtained to a small extent by use of scale and tape measure, most ginners supplied this information on the basis of either invoices or their own prior determinations. A small proportion of ginners stated that they did not know the weight of their bagging. In such cases, when bagging was not available for weighing, this information generally was obtained from the suppliers.

Findings were tabulated and weighted according to cotton ginnings by farm management districts within each State, to provide estimates by State, by region, and for the Belt as a whole. Information on the baling of extra long staple cotton at roller gins was not included in the study.

TYPES AND CONDITION OF BALING MATERIALS

Bagging

Coverings for square bales have been confined almost exclusively to two types of bagging--open-weave jute and sugar-bag cloth. Open-weave jute is a coarse, open-mesh material designed for baling American cotton. Sugar-bag cloth is derived from bags used in importing raw sugar, and is closely woven. Relatively small amounts of other materials, such as sisal and cotton, have been used commercially for short periods, both as a single material or mixed with jute. Sisal proved objectionable to spinners. Cotton was abandoned as too costly and too light in weight. Every crop, however, includes a few thousand bales wrapped with an odd variety of usually unsuitable materials, such as bags that had contained fertilizer, cocoa, hops, or feed.

A half century ago, open-weave jute was vastly more popular than sugar-bag cloth. During the period 1909 to 1912, about 85 percent of production was wrapped with open-weave jute. 2/ Since that time, use of sugar-bag cloth has increased.

Estimates obtained through this study showed that about 54 percent of bales in the 1957-58 season were covered with open-weave jute bagging, and the other 46 percent were almost entirely in sugar-bag cloth (table 1). About 25,000 bales were reported as wrapped with miscellaneous materials, including experimental baggings being tested under the auspices of the National Cotton Council, but this minor amount was not included in the tabulations.

Use of sugar-bag cloth was greatest in the Southeast and Southwest, while open-weave jute was the leading bagging in the South Central and Western regions. Ginners in some States ran counter to the regional pattern, as evidenced by the popularity of sugar-cloth bagging in Louisiana and New Mexico and of open-weave jute in South Carolina and Oklahoma.

For the Belt as a whole, only 1 percent of the total crop was wrapped in second-hand open-weave jute bagging. Use of such material was most common in South Carolina and Tennessee, with smaller amounts used in Georgia, Missouri, and Alabama. Elsewhere, the open-weave jute used was new bagging. This represents an improvement over the last such tally, made at the close of the 1933-34 season, when about 8 percent of the crop was covered with baggings made almost entirely of second-hand open-weave jute. 3/

2/ Wright, J. W., "Baggings Used for Covering American Cotton Bales," U. S. Dept. Agr. June 1935 (processed).

3/ See footnote 2.

Table 1.--Cotton bale covers: Proportionate use of specified types of bagging and ties by ginners in baling upland cotton, by States and regions, season 1957-58 1/

State and region	Proportion of bales wrapped in-				Proportion of bales tied with-		
	Sugar-bag cloth	Open-weave jute		All types	New ties	Second-hand ties	All types
		New	Second-hand				
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Alabama........	94	4	2	100	80	20	100
Georgia........	67	29	4	100	71	29	100
North Carolina..	60	40	---	100	51	49	100
South Carolina..	33	55	12	100	40	60	100
Southeast 2/	67	28	5	100	64	36	100
Arkansas.......	7	93	---	100	100	3/	100
Louisiana......	66	34	---	100	100	---	100
Mississippi....	29	71	---	100	100	---	100
Missouri.......	4	92	4	100	95	5	100
Tennessee......	19	73	8	100	91	9	100
South Central	23	75	2	100	98	2	100
Oklahoma.......	2	98	---	100	100	---	100
Texas..........	76	24	---	100	100	3/	100
Southwest....	71	29	---	100	100	3/	100
Arizona........	18	82	---	100	100	---	100
California.....	17	83	---	100	100	---	100
New Mexico.....	75	25	---	100	100	---	100
West.........	22	78	---	100	100	---	100
United States..	46	53	1	100	95	5	100

1/ Excludes about 25,000 bales wrapped in miscellaneous and experimental bagging.

2/ Regional total includes other States in region not shown individually.

3/ Less than 0.5 percent.

About 96 percent of ginners used 1 type of bagging exclusively throughout the season. The 4 percent of ginners who used both types during 1957-58 were widely scattered except for a moderate concentration in east Texas.

Each ginner was asked the reason for his selection of bagging. About two-fifths of ginners using open-weave jute and 30 percent of those favoring sugar-bag cloth said their choices were based on custom. Of open-weave jute users who supplied specific answers, favorable attributes in order of importance were: (1) Open meshes provided "finger holds" for easier handling of bales by gin crews and growers; (2) performance was better in humid climates, since bales dampened by showers dried out more readily with less staining of surface cotton; (3) appearance was more attractive; (4) bales were easier to handle at press; and (5) the bagging was heavier in weight. Among supporters of sugar-bag cloth, more than one-fourth cited better bale protection and another one-fourth said economy was the prime factor. In west Texas and New Mexico, closely woven sugar-bag cloth was favored particularly as the better protective covering against dust and sand storms. In most parts of the Belt, ginners said sugar-bag cloth was cheaper than new open-weave jute. Minor reasons for favoring sugar-bag cloth included greater ease of use in wooden presses, neater appearance, and easier handling of bales with cotton hooks.

Ties

During 1957-58, approximately 95 percent of bales were bound with new ties. Use of second-hand ties was sizable only in the Southeast, where more than one-third of bales were tied with used material. In the major cotton-mill States of North Carolina and South Carolina, about one-half and three-fifths, respectively, of the cotton was baled with second-hand ties. Except for small-scale use in Tennessee and Missouri, ginners elsewhere purchased new ties. The popularity of second-hand ties and open-weave bagging and of sugar-bag cloth in the Southeast has several explanations. Second-hand materials are readily available from mills located throughout the region. More important, however, is economic pressure. Ginners in the Southeast, in contrast with those in other regions, face the double disadvantage of receiving the lowest fee per bale for ginning and wrapping, and the smallest average annual volume per gin.

WEIGHT AND DIMENSIONS OF BALING MATERIALS

Weight of Materials

Based on practical experience, 2 strips of bagging, each 3 yards long, are considered as a standard covering for a gin flat bale. Such a pattern of bagging provides sufficient material to give complete coverage of the heads of flat bales of usual weight.

Open-weave jute bagging manufactured and cut in strips specifically for bale covering is reasonably well standardized across the Belt as to length, width (generally 44 inches), and weight per linear yard (usually 2 pounds). When used in standard length, such bagging weighs 12 pounds per bale. Sugar-bag cloth, because of its variety of origins, is more variable in width and weight per yard than the open-weave fabric. Widths for sugar-bag cloth vary from 40 to 54 inches, although most of it is either 48 or 50 inches wide. Weights per yard range from 1-1/2 pounds to about 2-1/4 pounds, but, until recent years, 1-3/4 pounds was a very popular type. Total weight of such bagging per bale may run from 9 to 13-1/2 pounds.

During the 1957-58 season, the weight of open-weave jute bagging in use averaged 2 pounds per yard for the Belt as a whole, or exactly equal to the traditional standard (table 2). Weight per yard by States was either 32 or 33 ounces except in Alabama, where little open-weave jute was used and much of that was second-hand material.

Table 2.--Cotton bale tare: Average weight of materials used in baling cotton, by States and regions, season 1957-58

State and region	Average weight of bagging: Per linear yard: Sugar-bag cloth	Average weight of bagging: Per linear yard: Open-weave jute	Average weight of bagging: Per bale, all types	Average weight of ties per bale	Total tare per bale
	Ounces	Ounces	Pounds	Pounds	Pounds
Alabama	30	35	11.2	9.3	20.5
Georgia	31	33	11.9	9.2	21.1
North Carolina	28	32	11.1	9.1	20.2
South Carolina	29	32	11.7	9.2	20.9
Southeast 1/	30	33	11.5	9.2	20.7
Arkansas	32	32	12.0	9.5	21.5
Louisiana	31	33	11.7	9.1	20.8
Mississippi	34	32	12.3	9.9	22.2
Missouri	32	32	12.0	9.6	21.6
Tennessee	33	33	12.2	9.6	21.8
South Central 1/	32	32	12.1	9.7	21.8
Oklahoma	33	32	11.4	9.0	20.4
Texas	32	32	11.8	9.0	20.8
Southwest	32	32	11.8	9.0	20.8
Arizona	30	32	11.3	9.5	20.8
California	31	32	11.9	9.1	21.0
New Mexico	33	32	12.2	9.1	21.3
West	31	32	11.7	9.2	20.9
United States	31	32	11.8	9.3	21.1

1/ Regional total includes other States in region not shown individually.

Sugar-bag cloth had a Belt-wide average weight of 31 ounces per yard, although differences among States were as much as 6 ounces per yard. A lighter weight of sugar-bag cloth was used throughout the Southeast than elsewhere. In Texas, where slightly more than half of all sugar-bag cloth was used, weights per yard averaged a full 2 pounds.

These unit weights of bagging, multiplied by the lengths of bagging used, gave total weights of bagging per bale, which were lowest in the Southeast at 11.5 pounds and highest in the South Central region at 12.1 pounds. In the Southwest and West, the average weight per bale was slightly less than 12 pounds. For the Belt as a whole, the average was 11.8 pounds per bale. The weight of bagging applied per bale in Alabama and North Carolina was only slightly more than 11 pounds, a pound less than the average weight used in New Mexico, Tennessee, and Mississippi.

As a rule-of-thumb measure, the weight of ties per bale is assumed to be 9 pounds. During 1957-58, the Belt-wide average was 9.2 pounds of ties per bale. In most States, ties averaged either 9 pounds per bale or only an ounce or 2 above this assumed standard. But in Arizona, Arkansas, Missouri, Tennessee, and Mississippi, the average bales carried from 9.5 to 9.9 pounds of ties.

For the entire upland crop, bale tare (combined weight of bagging and ties) averaged 21.1 pounds, almost exactly the 21-pound traditional standard. By States, however, moderate variations occurred, ranging from an average of 20.2 pounds per bale in North Carolina up to 22.2 pounds in Mississippi. By regions, average bale tare in the Southeast, Southwest, and West varied between 20.7 and 20.9 pounds. In the South Central region, bales carried an average tare of 21.8 pounds, or about 1 pound greater than elsewhere in the Belt.

Dimensions of Bagging

Interest in dimensions of bagging, especially length, has been stimulated by the recent Commodity Credit Corporation regulation on coverage of bale heads. Sugar-bag strips used during the 1957-58 season averaged 49 inches in width and 108 inches in length (table 3). Differences in dimensions for such bagging among the several regions were minor.

Across the Belt, open-weave jute bagging strips averaged 45 inches in width and 107 in length. In the Southeast and South Central regions, the open-weave fabric was used in full-length 108-inch strips. In the Southwest and West, such bagging averaged only 105 inches per strip.

On a Belt-wide basis, 87 percent of the sugar-bag cloth applied as bagging was 108 inches or longer and 13 percent was shorter than 108 (table 4). About 83 percent of the open-weave jute bagging was 108 inches or longer, and 17 percent was shorter.

Table 3.--Cotton bale bagging: Average dimensions of duplicate strips of bagging used in wrapping upland cotton bales, by region, season 1957-58

Type of bagging and dimension	Average size of strip of bagging 1/				
	Southeast	South Central	Southwest	West	United States
	Inches	Inches	Inches	Inches	Inches
Sugar-bag cloth:					
Length	108	107	107	108	108
Width	49	50	49	49	49
Open-weave jute:					
Length	108	108	105	105	107
Width	45	44	44	47	45

1/ Two strips of equal size are placed on each bale, so the total length of bagging used per bale is twice the length cited above.

Table 4.--Length of bagging on cotton bales: Variations in length of duplicate strips of bagging used by ginners in covering cotton bales, by regions, season 1957-58

Length of strip bagging (inches) by type 1/	Southeast	South Central	Southwest	West	United States
	Percent	Percent	Percent	Percent	Percent
Sugar-bag cloth:					
101 and shorter	1	10	1	---	2
102 to 107	2	10	15	13	11
108 2/	87	64	83	87	82
109 to 114	7	15	1	---	4
115 and longer	3	1	---	---	1
All sugar-bag cloth	100	100	100	100	100
Open-weave jute:					
101 and shorter	3/	---	19	22	11
102 to 107	4	6	13	3	6
108 2/	95	91	68	69	80
109 to 114	1	3	---	6	3
115 and longer	---	---	---	---	---
All open-weave	100	100	100	100	100

1/ Two strips of bagging of approximately equal length are used to cover each bale.

2/ Standard practice is for each strip to measure 108 inches or 3 yards in length, making a total of 6 linear yards of bagging per bale.

3/ Less than 0.5 percent.

In the Southeast, more than 95 percent of each type of bagging was of standard length or longer. Open-weave jute--the bagging most favored in the South Central region--was used in standard or longer lengths in 94 percent of cases. In both the Southwest and West, about one-fifth of the open-weave jute bagging was 101 inches or shorter. Open-weave jute was the principal bagging in the West and about 42 percent of such bagging used in lengths of 101 inches and shorter was applied to extra-density bales, which are appreciably smaller than flat bales. In the Southwest, where sugar-bag cloth is used extensively, 16 percent of such bagging was shorter than standard length, but the shorter lengths were not utilized by gins turning out extra-density bales.

SPECIFIC INFORMATION ON TIES AND BUCKLES

Of the approximately 6,300 saw gins active in 1957-58, about 6,185 operated regular-density presses and about 115 gins were equipped with extra-density presses. The regular presses turn out the so-called flat or gin bales which are bound with 6 ties and accounted for 95 percent of upland cotton production during 1957-58 (table 5). Generally, extra-density gin presses are designed to provide standard-density bales, although a few are capable of pressing to high density. Bales from these gins require 8 or 9 ties, most bales being tied with 8. Such gins are concentrated in California, Texas, Arizona, and New Mexico. The approximately 2 percent of saw gins operating extra-density presses handled about 5 percent of upland cotton production.

As previously mentioned, 5 percent of upland bales were bound with second-hand ties. Reused ties, however, were applied solely to flat bales, and all extra-density bales were bound with new ties.

New flat bale ties come in 2 weights, commonly called 45-pound and 60-pound ties. These designations originate from the fact that such ties frequently are delivered to gins in strapped bundles of 30 ties and buckles. Bundles weigh either 45 pounds or 60 pounds, providing ties for 5 bales at 9 pounds or 12 pounds per bale, respectively. In 1957-58, 83 percent of upland bales were tied with new ties weighing 9 pounds per bale. Although only 7 percent of the total of upland bales were bound with new ties of 12-pound weight per bale, about one-fifth of ginnings in the South Central region were baled with these extra-density ties.

Flat bale ties are 15/16 inch wide and normally 11 feet, 6 inches long, although some of the ties weighing 12 pounds per bale are sold in 12-foot lengths. The ties with a weight of 9 pounds per bale are made of approximately 19-gauge steel and the 12-pound ties are about 18-gauge. [4] The 8 or 9 ties placed on extra-density bales at gins are shorter, and weigh about the same per bale as the most commonly used 6 ties for a flat bale. Ties used on extra-density bales ranged from 9 feet to 9 feet, 6 inches in length, with an average length of 9 feet, 3 inches. Weights of such ties per bale averaged about 9 pounds in the Southwest and 10 pounds in the West.

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[4] Birmingham Wire Gauge.

Table 5.--Cotton bale ties: Proportionate use of specified conditions and weights of ties in baling upland cotton, by region, season 1957-58 1/

Region	Proportion of upland cotton packaged as-				
	Flat bales with-			Extra-density bales (8 or 9 new ties)	Total
	6 new ties		6 second-hand ties 2/		
	Weighing 9 pounds per bale	Weighing 12 pounds per bale			
	Percent	Percent	Percent	Percent	Percent
Southeast	59	5	36	---	100
South Central	78	20	2	3/	100
Southwest	96	3/	3/	4/ 4	100
West	82	2	---	5/ 16	100
United States	83	7	5	5	100

1/ All weights represent weight of ties and necessary buckles.
2/ Second-hand ties weighed approximately 9 pounds per bale.
3/ Less than 0.5 percent.
4/ Average weight of ties per bale was approximately 9 pounds.
5/ Average weight of ties per bale was 10 pounds.

Ties are secured in place at gins with steel buckles which normally accompany the ties at time of purchase. For decades, ties have been fastened on gin bales almost exclusively with a slotted flat buckle commonly called an "arrow" buckle. When bales are compressed, arrow buckles are replaced with heavy gage wire buckles which are stronger and have less tendency to cause shearing of ties. When a few gins in the West began to install extra-density presses, several special designs of buckles were developed to meet the requirements for added strength. At the same time, interest began to build up in improving the buckles for gin flat bales. Practically all cotton bale ties and buckles of domestic manufacture are produced by 2 firms. In the 1955-56 season, 1 firm came out with a new design of buckle to replace the arrow buckle and the second firm also offered a different but newly designed flat bale buckle in commercial quantity in 1957. In this report, these new replacements for arrow buckles are termed improved flat bale buckles.

During the 1957-58 season, 28 percent of upland bales carried arrow buckles, their use being the more common in the Southeast and West (table 6). Approximately two-thirds of the upland crop was baled with improved flat bale buckles, a remarkable acceptance and distribution of the 2 newer types of design originating in 1955 or later. Use of the improved flat bale buckles was relatively great in the South Central and Southwest regions, where ties on about four-fifths and three-fourths of the bales, respectively, were fastened with the newer buckles. The remainder of upland production, about 6 percent, was baled with any one of several designs of buckles listed as "other," these being the types of buckles generally designed for and used principally on bales pressed to extra-densities at gins.

Table 6.--Cotton bale buckles: Proportionate use by ginners of specified types of buckles in baling cotton, by regions, season 1957-58

Region	Type of buckle			All types
	Arrow	Improved flat bale	Other 1/	
	Percent	Percent	Percent	Percent
Southeast	48	52	---	100
South Central	19	81	2/	100
Southwest	21	74	5	100
West	41	42	17	100
United States	28	66	6	100

1/ Includes a variety of buckles chiefly designed for and utilized in tying out standard and high-density bales at gins.

According to available estimates, about 29 percent of ties used in baling the 1957-58 crop were of foreign origin. 5/ These imported ties normally come equipped with buckles which chiefly are of the arrow type. The relatively high rate of use of arrow buckles in the West possibly was a result of a comparatively greater use of imported ties in that region. The popularity of arrow buckles in the Southeast apparently reflected the sizable dependence on second-hand material salvaged from bales produced in prior seasons.

Beginning with the 1958-59 crop, both domestic tie manufacturers were planning to feature the same type of buckle, an improved side-opening design which is tumbled (processed to minimize sharp edges and reduce shearing of ties). Indications also are that foreign producers are adopting or may adopt a similar type of buckle. The apparent result should be a standardized flat bale buckle of improved design for American cotton, a goal long advocated by the national association representing the cotton warehouse and compress industry and by others.

SOME PROBLEMS OF GINNERS IN BALING COTTON

Over the years, there has been a tendency for increased effort and responsibility to be placed on the ginner in the baling operation. Ginners now have a definite obligation to wrap bales with sufficient bagging to provide complete coverage of heads, as previously mentioned. Also, in many areas, ginners have the problem of maintaining some control over the weight of bales. Lightweight bales long have been subject to penalty in marketing channels, because of excess tare. In more recent years, overweight bales likewise have

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5/ Simple average of separate estimates by each of the two major domestic manufacturers of cotton bale ties and buckles. These firms also cooperated in providing other data on ties and buckles.

been subjected to sizable price discounts in some parts of the Belt. 6/ Formerly, growers brought cotton to gins almost exclusively in wagons or small trailers designed to hold sufficient seed cotton to turn out a bale of usual size, and ginners had no direct control over bale weight. Now much cotton arrives at gins in large trailers carrying cotton for 2 to 4 bales or even 6 or more. Ginners then must attempt to control the baling operation to provide the grower with several bales, each of a weight which is free from penalty. Sometimes ginners tie out the last bale of a load before ginning is completed, and buy the remaining unbaled lint to avoid an overweight bale.

Another particularly vexing problem to ginners has been the baling of cotton with low moisture content. Much cotton is dried at gins to a low moisture level to achieve maximum trash removal by gin cleaning machinery. Such cotton, although pleasing to growers in terms of resulting grade, often is spongy and resilient, and therefore difficult to press and confine in bale form, especially if bales are much above average in weight. Although such bales may leave the gin with all ties intact, there is considerable belief that they are subject to excessive failure of ties or buckles later on when the bales regain moisture. The entire problem is complex, since considerable proof exists that excessive heat-drying in ginning often adversely affects the spinning performance of cotton.

Many ginners have tried to offset the difficulties of baling low-moisture cotton either by use of heavier ties or by adding moisture back to the lint just before baling. No previous data are available on comparative use of 60-pound ties (12 pounds per bale) versus the usual 45-pound ties (9 pounds per bale) but comments by many users of the heavier ties in 1957-58 indicated that adoption of these ties was fairly recent and was due to increased baling problems. This supposition is supported by the fact that the heavier ties are more costly. 7/ Also, slightly more than one-fifth of ginners using 60-pound ties also used 45-pound ties, and they limited application of the heavier ties to bales of above-average weight.

Another approach by ginners has been the installation of devices to add moisture, usually water with a wetting agent, in spray form at the lint slide just before the ginned cotton drops into the press. In 1957-58, about 14 percent of saw gins were equipped with devices for conditioning lint by the addition of moisture (table 7). Only 10 percent of gins, however, reported operating such equipment. The 4 percent of gins with such devices in place but not in use were concentrated in the South Central region where, in many sections, heavy rains caused serious crop losses in 1957-58 and much cotton was not dried down to levels causing pressing difficulties. Installation of lint conditioners by ginners in the Southeast, has been negligible, but from 20 to 30 percent of ginners in other regions have equipped gins with such devices.

6/ Variations in Cotton Bale Weights With Application to Lightweight and Overweight Bales, U. S. Dept. Agr., AMS, Oct. 1954 (processed).

7/ Domestic producers reported that prices charged for 60-pound ties were 1/3 greater than those received for 45-pound ties.

Table 7.--Cotton gins: Use of lint moisture conditioning devices, by regions, season 1957-58

Region	Proportion of gins equipped with lint moisture conditioning devices: Making use of such devices	Proportion of gins equipped with lint moisture conditioning devices: Not using such devices	Proportion of gins not equipped with lint moisture conditioning devices	All gins
	Percent	Percent	Percent	Percent
Southeast	1	1	98	100
South Central	12	7	81	100
Southwest	14	4	82	100
West	24	5	71	100
United States	10	4	86	100

Gins having and using such equipment handled approximately 2 million bales in 1957-58. About 1.2 million bales were conditioned by addition of an average weight of 4.7 pounds of moisture per bale (table 8). In relation to total volume handled, ginners in the West made the greatest use of lint slide spray devices by conditioning 18 percent of their total ginnings, as against about 10 percent in both the Southwest and South Central regions. Ginners in the South Central region, however, added from 1-1/2 pounds more moisture per bale than did ginners in the West, and 2 pounds more than those in the Southwest.

Table 8.--Upland cotton ginnings: Volume of ginning according to use of lint moisture conditioning devices at gins, by regions, season 1957-58

Region	Volume of ginnings, all gins 1/	Volume of ginnings at plants making use of devices for adding moisture to lint: Without conditioning	Volume of ginnings at plants making use of devices for adding moisture to lint: Conditioned by addition of moisture	Average weight of moisture added per bale conditioned
	Bales	Bales	Bales	Pounds
Southeast	1,513,009	10,598	15,606	2.8
South Central	2,969,718	191,566	330,602	6.0
Southwest	3,833,006	398,486	396,140	3.9
West	2,472,809	223,647	444,698	4.5
United States	10,788,542	824,297	1,187,046	4.7

1/ As reported by the U. S. Bureau of the Census, March 24, 1958.

For the Belt as a whole, ginners operating such devices tended to use them in a selective manner. Of the total number of ginners making use of the devices, only 29 percent added moisture to all bales ginned.

The majority of ginners using the lint conditioners indicated that this practice improved the pressing and baling operation. Some commented that operation of these devices helped control static electricity. Some ginners also believed that the addition of moisture was an equitable means of partly compensating growers for losses in bale weights resulting from high-heat drying of seed cotton. Only a small proportion of ginners reported weight additions of moisture per bale that greatly exceeded the average rates of application.

COMMENTS OF GINNERS ON BALE IMPROVEMENT

Ginners cooperating in the study were asked for suggestions on how to improve the bale package. Only 29 percent of the ginners offered any suggestions. This failure of the great majority of ginners to advance specific recommendations was not interpreted as indifference. Many comments indicated that ginners as a group strongly feel that the cotton package can and should be improved. The consensus, however, was that ginners working alone can accomplish little and that, under existing trading rules and marketing practices, the present bale is satisfactory at the time it leaves the gin.

Of those ginners who made a definite reply, 54 percent stated that eliminating or reducing the cutting of bales during the marketing process offered the best opportunity for improvement. The most frequent suggestion along this line advocated greater use and trade support of the automatic sampling of cotton at gins. Many favorable references were made to the type of automatic sampler in use at 47 gins during 1957-58; but some said this sampler was too costly and too complicated for practical widespread adoption, and recommended development of a simpler apparatus. Others believed that samples should be cut from the bale, but either on a very restricted scale or by cutting flaps or openings in the wrappings in such a way that the opening could be closed again.

Another 32 percent of replying ginners centered attention on the baling materials. Such suggestions included use of longer or stronger bagging, complete coverage of the bale, or changes in rules to foster use of cotton bagging. Also, 4 percent of the responding ginners recommended changes in bale form to a smaller, denser bale with greater weight uniformity than now prevails.

The final 10 percent of replies advocated greater care in tying bales at gins and more careful handling and protection of bales from weather throughout marketing channels. This group was of the opinion that the bale package was the victim of general indifference.

When the whole list of suggestions is reviewed, it is evident that even the ginners who make the bale cannot independently effect great improvement in the package. Improvement in bale coverings is a problem that challenges the full cooperative effort of all segments of the cotton industry.

Soxman, R C 1904–
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